CLAIMS

1. A method for estimating the latency of aperiodic tasks in systems with simultaneous scheduling of aperiodic messages and periodic transmissions on a common bus, comprising the steps of:

(a) using predefined periodic transmission times, calculating data transition points between periodic and aperiodic message transmissions intervals for hyperperiods of interest in said system;

(b) using said data transition points to produce a series of aperiodic latency estimation inflection points;

(c) collecting data points of aperiodic message transmissions for hyperperiods of interest in said system; and

(d) estimating the aperiodic latency probability at an inflection point in said hyperperiod as being equal to the number of sample data points less than or equal to the said inflection point divided by the total number of collected aperiodic latency sample data points, said data points forming a data point plot that is assumed to be linear between said aperiodic latency inflection points.

2. The method of claim 1, wherein said data points are plotted on the X axis of a graph and the empirical probability that the latency exceeds the time is plotted on the Y axis of said graph, such that latency estimation inflection points are selected along said X axis for said hyperperiod to visually represent values at which higher priority periodic message traffic will impact or cause a point of inflection on aperiodic latencies.

3. The method of claim 1, wherein said aperiodic latency estimation inflection points are formed by binning said aperiodic data points using fluid flow analysis dependent only on the timeline defined by periodic traffic.

4. The method of claim 3, wherein said fluid flow analysis employs an algorithm.

5. In a method for estimating the latency of aperiodic tasks in systems with simultaneous scheduling of aperiodic messages and periodic transmissions on a common bus, wherein predefined periodic transmission times are used to calculate data transition points between periodic and aperiodic message transmissions intervals for hyperperiods of interest in said system, data points of aperiodic message transmissions for hyperperiods of interest in said system are collected and the aperiodic latency probability at an inflection point in said hyperperiod is estimated as being equal to the number of sample data points less than or equal to the said inflection point divided by the total number of collected aperiodic latency sample data points, said data points forming a data point plot that is assumed to be linear between said aperiodic latency inflection points, the improvement comprising:

using said data transition points to produce a series of aperiodic latency estimation inflection points.

6. The method of claim 5, wherein said data points are plotted on the X axis of a graph and the empirical probability that the latency exceeds the time is plotted on the Y axis of said graph, such that latency estimation inflection points are selected along said X axis for said hyperperiod to visually represent values at which higher priority periodic message traffic will impact or cause a point of inflection on aperiodic latencies.

7. The method of claim 5, wherein said aperiodic latency estimation inflection points are formed by binning said aperiodic data points using fluid flow analysis dependent only on the timeline defined by periodic traffic.

8. The method of claim 7, wherein said fluid flow analysis employs an algorithm.

9. A system for simultaneous scheduling aperiodic messages and periodic transmissions on a common bus, comprising:

(a) means for calculating data transition points between periodic and aperiodic message transmissions intervals for hyperperiods of interest in said system using predefined periodic transmission times;

(b) means for using said data transition points to produce a series of aperiodic latency estimation inflection points;

(c) means for collecting data points of aperiodic message transmissions for hyperperiods of interest in said system; and

(d) means for estimating the aperiodic latency probability at an inflection point in said hyperperiod as being equal to the number of sample data points less than or equal to the said inflection point divided by the total number of collected aperiodic latency sample data points, said data points forming a data point plot that is assumed to be linear between said aperiodic latency inflection points.

10. The system of claim 9, wherein said data points are plotted on the X axis of a graph and the empirical probability that the latency exceeds the time is plotted on the Y axis of said graph, such that latency estimation inflection points are selected along said X axis for said hyperperiod to visually represent values at which higher priority periodic message traffic will impact or cause a point of inflection on aperiodic latencies.

11. The system of claim 9, wherein said aperiodic latency estimation inflection points are formed by binning said aperiodic data points using fluid flow analysis dependent only on the timeline defined by periodic traffic.

12. The system of claim 9, wherein said fluid flow analysis employs an algorithm.